



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/534,489

05/11/2005

Sung Ho Choo

3449-0477PUS1

7114

2292 7590 07/10/2008
BIRCH STEWART KOLASCH & BIRCH
PO BOX 747
FALLS CHURCH, VA 22040-0747

EXAMINER

ARMAND, MARC ANTHONY

ART UNIT

PAPER NUMBER

2814

NOTIFICATION DATE

DELIVERY MODE

07/10/2008

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

Office Action Summary	Application No. 10/534,489	Applicant(s) CHOO ET AL.	
	Examiner MARC ARMAND	Art Unit 2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 April 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 and 53 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 and 53 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 May 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>03/13/2007</u> . | 6) <input type="checkbox"/> Other: _____ |

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1, 3-10 are rejected under 35 U.S.C. 103(a) as being obvious over Kim et al., (KR 226831 B) in view of Parikh et al., (Parikh) US 2003/0015708.

Regarding to claims 1 and 3, Kim shows in fig.1c and discloses (para 16) an Gan LED device having a GaN-based layer (2); a high concentration GaN-based layer (4) formed on the GaN-based layer (2); a first metal (5) formed on the GaN-based layer (4); another metal layer (8) formed on the first metal (5); and a conductive layer (7) formed on the third metal (5) layer.

Kim in this embodiment differs from the claimed invention because he does not explicitly disclose a semiconductor device having a first metal layer formed on the first metal-Ga, metal Ga-N compound layer; a third metal-Al, a high concentration layer.

Kim in another embodiment discloses fig.2c an LED device having a GaTi or GaTiN layer (15) (para 34 and 40) and an Al layer (16) formed over the layer (15). Moreover, he discloses that epitaxial layer are High-doped, therefore they have a high concentration.

Kim is evidence that ordinary workers skilled in the art would find reasons, suggestions or motivations to modify the device of Kim (first embodiment). Therefore, At the time the invention was made; it would have been obvious to have an LED device having a GaTi or GaTiN layer and a high concentration layer, teaching of Kim (first embodiment prior at) in it's device because it will provide a device with good conductivity (para 22).

Parikh in fig.5, shows an Led device having a high concentration GAN-bases layer (52) (para 0054) formed on the GaN-based layer and a metal-Al coumpound layer (54) (para 0054).

Parikh is evidence that ordinary workers skilled in the art would find reasons, suggestions or motivations to modify the device of Kim (first embodiment). Therefore, at the time the invention was made; it would have been obvious to have an LED device having a high concentration GAN-bases layer formed on the GaN-based layer and a metal-Al coumpound layer because it will keep the reverse current low (para 0012).

5. Claim 2, 4-10 are rejected under 35 U.S.C. 103(a) as being obvious over Kim et al., (KR 226831 B) in view of Parikh et al., (Parikh) US 2003/0015708 and in view of Ito (Ito) US2002/0121637 and in view of Uemura et al., (2003/0107053).

Regarding to claims 2, Kim shows in fig.1c and discloses (para 16) an Gan LED device having a GaN-based layer (2); a high concentration GaN-based layer (4) formed on the GaN-based layer (2); a first metal (5) formed on the GaN-based layer (4); another metal layer (8) formed on the first metal (5); and a conductive layer (7) formed on the third metal (5) layer.

Kim in this embodiment differs from the claimed invention because he does not explicitly disclose a semiconductor device having a first metal layer formed on the first metal-Ga, metal Ga-N compound layer; a third metal-Al, a high concentration layer; a transparent electrode layer.

Kim in another embodiment discloses fig.2c an LED device having a GaTi or GaTiN layer (15) (para 34 and 40) and an Al layer (16) formed over the layer (15). Moreover, he discloses that epitaxial layer are High-doped, therefore they have a high concentration.

Kim is evidence that ordinary workers skilled in the art would find reasons, suggestions or motivations to modify the device of Kim (first embodiment). Therefore, At the time the invention was made; it would have been obvious to have an LED device having a GaTi or GaTiN layer and a high concentration layer, teaching of Kim (first embodiment prior at) in it's device because it will provide a device with good conductivity (para 22).

Parikh in fig.5, shows an Led device having a high concentration GAN-bases layer (52) (para 0054) formed on the GaN-based layer and a metal-Al coumpound layer (54) (para 0054).

Parikh is evidence that ordinary workers skilled in the art would find reasons, suggestions or motivations to modify the device of Kim (first embodiment). Therefore, at the time the invention was made; it would have been obvious to have an LED device having a high concentration GAN-bases layer formed on the GaN-based layer and a metal-Al coumpound layer because it will keep the reverse current low (para 0012).

Ito shows in fig.1b a transparent electrode layer (106) (para 0069).

Ito is evidence that ordinary workers skilled in the art would find reasons, suggestions or motivations to modify the device of Kim (first embodiment). Therefore, at the time the invention was made; it would have been obvious to have a transparent electrode layer because it will improve the efficiency (para 0099).

Uemura shows in fig.6 an LED device having a translucent electrode over a Group III base layer.

Uemura is evidence that ordinary workers skilled in the art would find reasons, suggestions or motivations to modify the device of Kim (first embodiment). Therefore, at the time the invention was made; it would have been obvious to have an LED device having a transparent electrode because it will provide the light efficiency of the device (para 0013.

Regarding to claim 4, Kim shows in fig.1d and discloses (para 19) that the GaN-based layer is P-type or N-type.

Regarding to claim 5, Kim shows in fig.1d a metal layer 8 that is of one selected from the group consisting of Cr.

Regarding to claim 6, Kim shows in fig.1d and discloses (para 19) wherein the first metal layer is of a metal or compound having a high reactivity with Ga and N.

As for the statement “a high reactivity” it is considered a functional language. Labels, statements of intended use, or functional language do not structurally distinguish claims over prior art. The structure of the device is substantially identical to that of the claimed structure which can function in the same manner, be labeled in the same manner, or be used in the same manner. *MPEP 2112.01*.

Regarding to claim 8, Kim shows in fig.2c an LED wherein the third metal is of a metal or compound having a high reactivity with Al.

As for the statement “a high reactivity” it is considered a functional language. Labels, statements of intended use, or functional language do not structurally

distinguish claims over prior art. The structure of the device is substantially identical to that of the claimed structure which can function in the same manner, be labeled in the same manner, or be used in the same manner. *MPEP 2112.01*.

Regarding to claim 9, Kim shows in fig.1d an LED wherein the third metal (7) is made of AU.

As for the statement “metal or a compound not having reactivity with the material forming the conductive oxidation preventive layer” it is considered functional language. Labels, statements of intended use, or functional language do not structurally distinguish claims over prior art. The structure of the device is substantially identical to that of the claimed structure which can function in the same manner, be labeled in the same manner, or be used in the same manner. *MPEP 2112.01*.

Regarding to claim 10, Kim shows in fig.1d an LED wherein the conductive oxidation preventive layer (7) is of Au.

6. Claims 1, 3-10 are rejected under 35 U.S.C. 103(a) as being obvious over Kim and Parikh in view of Uemura et al., (2003/0107053).

Regarding to claims 1 and 3, Kim shows in fig.1c and discloses (para 16) an Gan LED device having a GaN-based layer (2); a high concentration GaN-based layer (4) formed on the GaN-based layer (2); a first metal (5) formed on the GaN-based layer (4); another metal layer (8) formed on the first metal (5); a third metal (5) formed on the first metal layer ; and a conductive layer (7) formed on the third metal (5) layer.

Kim in this embodiment differs from the claimed invention because he does not explicitly disclose a semiconductor device having a first metal layer formed on the first metal-Ga, metal Ga-N compound layer; a third metal-Al, a high concentration layer, a transparent electrode.

Kim in another embodiment discloses fig.2c an LED device having a GaTi or GaTiN layer (15) (para 34 and 40).Moreover, he discloses that epitaxial layer are High-doped, therefore they have a high concentration.

Kim is evidence that ordinary workers skilled in the art would find reasons, suggestions or motivations to modify the device of Kim (first embodiment). Therefore, At the time the invention was made; it would have been obvious to have an LED device having a GaTi or GaTiN layer; teaching of Kim (first embodiment prior at) in it's device because it will provide a device with good conductivity (para 22).

Parikh in fig.5, shows an Led device having a high concentration GAN-bases layer (52) (para 0054) formed on the GaN-based layer and a metal-Al compound layer (54) (para 0054).

Parikh is evidence that ordinary workers skilled in the art would find reasons, suggestions or motivations to modify the device of Kim (first embodiment). Therefore, at the time the invention was made; it would have been obvious to have an LED device having a high concentration GAN-bases layer formed on the GaN-based layer and a metal-Al compound layer because it will keep the reverse current low (para 0012).

Uemura shows in fig.6 an LED device having a translucent electrode over a Group III base layer.

Uemura is evidence that ordinary workers skilled in the art would find reasons, suggestions or motivations to modify the device of Kim (first embodiment). Therefore, at the time the invention was made; it would have been obvious to have an LED device having a transparent electrode because it will provide the light efficiency of the device (para 0013.

Regarding to claim 7, Uemura discloses (para 0106) an LED having an electrode wherein the metal is of one selected from the group consisting of Ni, Pt and Pd.

It would have been obvious to one having ordinary skill in the art at the time of the invention was made to replace the material of Uemura (Pt or Pd) electrode with Kim's electrode, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. MPEP 2144.07.

Regarding claim 53, Kim shows in fig.2c an NP-type light emitting device.

Response to Arguments

7. Applicant's arguments with respect to claims 1-10, 53 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MARC ARMAND whose telephone number is (571)272-9751. The examiner can normally be reached on 9-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on 571-272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/MARC ARMAND/
Examiner, Art Unit 2814

/Wai-Sing Louie/
Primary Examiner, Art Unit 2814